Step 1 Learning Objectives for Lesson 12

When you have completed the instruction in this lesson, you will be trained to do the following:

- Explain the basic components of human biology.
- Describe the human body, including how it works and how it is put together.
- Define the terms used to locate parts of the body.

Step 2 Lesson Preview

When Leonardo da Vinci drew his sketches of the human body back in the 15th century, he probably didn’t anticipate just how important the study of the human body would become. In this lesson, you will be introduced to the basic components of human biology, including anatomy, physiology and pathology. Keep in mind that we do not expect you to memorize every term. The more familiar you are with your terminology, the quicker and easier it will be to complete some of your tasks as a healthcare document specialist. However, it is important you use your research tools. If you don’t remember a word while completing your lessons or while working, use your materials or flashcards to help. Once you begin working, you will see many of these terms on a daily basis, and you will become very familiar with them. For now, complete your Practice Exercises and concentrate on reviewing your flashcards and listening to pronunciations when you have an opportunity. Don’t hesitate to research terms when needed. You will soon be confident in your terminology skills!
Today many people use anatomy daily in their professions. Athletic coaches must be well versed in anatomy because their knowledge of muscles and bones helps their players achieve top performance and avoid injury. Doctors must know vast amounts of anatomy, from the top of the human head down to the little toe, and all the nerves, blood vessels and organs in between. Healthcare document specialists must know anatomy to understand the terms they see in their work. Your knowledge of medical terms as well as anatomy work together to ensure success in your field.

In this lesson, you will see how anatomy affects our everyday lives. We’ll begin with an introduction to the science of life—biology. After you learn about basic human biology, we will move into the more specific science of anatomy, including physiology—the study of how the body works. Don’t worry! We will move at a comfortable pace, and we’ll carefully cover each detail you must know. Soon you will see how easy and fun anatomy can be.

Step 3 Human Biology

- For the next several lessons, you will learn about the study of human living things. Because you are a human, you’ll learn a lot about yourself. In doing your Practice Exercises and studying your flashcards, you’ll grow in your understanding of the human body and the specialized terms doctors use to talk about the body.

**Human biology** is the study of how the body is put together and how it works in health and disease. As a healthcare document specialist, you do not need to become an expert in biology. However, understanding the basics of biology gives you a good background for the terms doctors use, such as those you learned about in our medical terminology lessons!

Human biology in the healthy state covers two basic concepts: *anatomy* and *physiology*. Human biology in disease deals with *pathology*. Look at how these concepts are related in the diagram on the following page.

We will discuss each of these topics in more detail. Remember, the idea is not to become an expert in biology, but to understand the context of the terms you might see in your daily work.
Anatomy

Anatomy is the science of the structure of the body—the appearance and relationships of body parts. The two kinds of anatomy are gross anatomy and microscopic anatomy.

- **Gross anatomy** includes parts of the body that we can see with our eyes. It is also called macroscopic anatomy.

- **Microscopic anatomy**, or cell anatomy, includes parts of the body that are too small to be seen with the naked eye.
Gross Anatomy

Gross anatomy focuses on the presence and appearance of a body part. The study of the form of body parts is called morphology. The form of a body part includes its size, shape, color, contour and texture. For example, when a kidney is normal in size, shape, color, contour and texture, it has normal morphology.

A basketball player and a jockey both have the same anatomic structure. For example, both have five fingers on each hand. However, there is a morphologic difference between them. For example, the hand of the basketball player may be larger than the hand of the jockey.

Gross anatomy also deals with the location and position of the organs and body parts. For example, not only should the heart be in the chest, but it should be in the left side of the chest.

Facts About Gross Anatomy

The terms used to describe gross anatomy include:
• The names of the body parts
• Where the body parts are located
• How the locations of two body parts are related

Microscopic Anatomy

Microscopic anatomy is the science of the body’s individual cells and tissues. This study is done with a microscope. The microscopic study of cells is called cytology. The microscopic study of tissues is called histology.

Facts About Microscopic Anatomy

The terms used to describe microscopic anatomy include:
• The names of different cell parts and cell types
• The colors cells become when they are dyed for microscopic examination
• The ways cells are arranged in different types of tissue
Physiology

Physiology is the study of how the body works; it describes the function of the body and its organs, tissues and cells.

Each organ, cell, or tissue has its own special physiologic function. For example, kidneys make urine, but they cannot think. The brain thinks, but it cannot make urine.

Physiology also can be divided into macroscopic physiology and microscopic physiology.

- **Macroscopic physiology** usually is called gross physiology.
- **Microscopic physiology** usually is called cell physiology.

Physiology can be broken into gross physiology and cell physiology.
Pathology deals with abnormalities of anatomy and physiology. Look at the relationships in the chart that follows. In the next section, we will describe the relationships represented by the circles.

Pathology deals with abnormal anatomy and abnormal physiology.
How Do Anatomy, Physiology and Pathology Relate to One Another?

In this section, we’ll examine normal anatomy and physiology.

**Normal Anatomy/Abnormal Physiology**

A person can have abnormal physiology but normal anatomy. For example, a diabetic has abnormal physiology—the person cannot make insulin—but the diabetic may have normal anatomy. The insulin-making function is abnormal but the appearance and location of the organ that makes the insulin, or the pancreas, is normal.

**Abnormal Anatomy/Normal Physiology**

A person can have abnormal anatomy but normal physiology. For example, a healthy dwarf has abnormal anatomy but normal physiology. The anatomy is abnormal, but it functions normally.

**Abnormal Anatomy/Abnormal Physiology**

When an anatomic abnormality lasts long enough, it may lead to a physiologic abnormality. For example, in early alcoholism, the liver changes by containing more fat and enlarging. These are anatomic abnormalities. The function is normal. If alcoholism continues long enough, the liver slowly stops functioning. This is a physiologic abnormality.

On the other hand, when a physiologic abnormality lasts long enough, it may lead to an anatomic abnormality. For example, at the start of a cold, you have sniffles and a loss of smell. These are physiologic abnormalities. The function of the nose is abnormal. The anatomy of the nose, its size and color, is normal. Later, you may have a swollen, red nose from the cold. Swelling and redness are pathologic changes in anatomy. Because swelling and redness are changes in size and color, they also can be called morphologic changes.

For most disease processes, anatomy and physiology both are abnormal by the time a diagnosis is made. For example, in the early stages of alcoholism, the liver functions well, and the liver function tests are normal. The diagnosis of alcoholic liver disease usually is not made. The patient feels fine and cannot believe that the liver is abnormal. When both the anatomy and physiology are pathologic, the patient feels sick, and the liver function tests are abnormal. The diagnosis is not usually made until both the anatomy and physiology are pathologic.
Likewise, in the early stages of a cold, when you just have sniffles, you say, “I think I’m getting a cold.” When your nose is red, swollen, stuffy and runny, you say, “I have a cold.” Again, the diagnosis isn’t usually made until both anatomy and physiology are abnormal.

So even though diseases can be divided into anatomic pathology and pathophysiology, medicine often deals with both anatomic and physiologic pathology at the same time.

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**Step 5 Practice Exercise 12-1**

- Determine the term(s) to complete each sentence. Use your flashcards if you need assistance.

1. Anatomy, physiology and pathology are included in the study of life called human __________________________.

2. When there are changes in the form of an organ, such as size, shape, or color, they are called __________________________ changes.

3. The science of the appearance and relationships of body parts is called __________________________.

4. The study of the function of body parts is called __________________________.

5. The study of disease is called __________________________.

6. The study of tissues is called __________________________.

7. The science of the appearance of cells and tissues is called __________________________.

8. To see a cell, you would use an instrument called a __________________________.

9. Changes in the function of an organ are called __________________________ changes.

10. The disease changes you see in an organ are called __________________________ changes.

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**Step 6 Review Practice Exercise 12-1**

- Check your answers with the Answer Key at the back of this book. Correct any mistakes you may have made.
Introduction to Anatomy

Step 7  Beginning Anatomy and Physiology Concepts

Now that you have a basic understanding of human biology, you are ready to move on to the more specific science of anatomy and physiology. Anatomy and physiology are two key components in the medical world. Remember:

- **Anatomy** refers to the structure of the body, or the appearance and relationships of body parts, such as muscles, bones, organs and other systems.

- **Physiology** is the study of how these body parts work together to sustain life, or the functions of the body and its organs, tissues and cells.

The Anatomic Position

Doctors use a system to describe the location of anatomical parts. This system assures that there is no confusion about the location of any body parts. The location of body parts is always described as if the patient were in the position shown in the following figure. This body position is called the anatomic position.

Notice the position of the hands in the figure. The palms face forward, and the thumbs face outward. No matter what the position of the patient, the doctor describes the location of anatomic parts as if the patient were in this position. Stand up and put your body in the anatomic position.

Be sure you remember the anatomic position. The terms you learn in this lesson are based on the relationships of body parts when the body is in this position. When you are working as a healthcare document specialist, understanding the anatomical position and the relationship to body parts will help you assign correct diagnostic and procedure codes.
Planes and Sections of the Human Body

The human body has three dimensions: height, width and depth.

Facts About Dividing the Body

The body can be divided in three different ways:
• Superior and inferior (top and bottom) sections
• Right and left sections
• Anterior and posterior (front and back) sections

Dividing the body like this helps you understand where organs or parts are located. You can divide the body into these sections by making a mental “slice” or “cut.”

Transverse Planes and Sections

The transverse or horizontal plane divides the body into superior (above) and inferior (below) sections. A transverse plane can be made anywhere in the body from the feet to the head.

➤ A transverse plane made at the neck divides the body into superior and inferior sections. The head is superior to the plane. The chest, arms, abdomen and legs lie inferior to the plane.

➤ A transverse plane made at the waist also divides the body into superior and inferior portions. The head, chest and arms are superior to the plane. The pelvis and legs are inferior to the plane.

➤ A transverse plane made at the level of the knees divides the body into superior and inferior sections, too. The thighs, abdomen, chest, arms and head are superior to the plane. The calves and toes are inferior to the plane.
**Sagittal Planes and Sections**

A sagittal or longitudinal plane divides the body into right and left sections. A midsagittal or median plane divides the body into equal right and left sections. A midsagittal plane is the midline of the body. A parasagittal plane divides the body into unequal right and left sections. A sagittal plane can be made at any point of the body from the right side to left side.

**Coronal Planes and Sections**

A coronal or frontal plane divides the body into anterior (front) and posterior (back) sections. A coronal plane can be made at any point from the front of the body to the back of the body.

- A coronal plane at the level of the ears divides the body into anterior and posterior sections. The face, abdomen and knees are anterior to the plane. The back, buttocks and ankles are posterior to the plane.

- A coronal plane at the level of the nose divides the body into anterior and posterior sections. The nose is anterior to the plane. Almost everything else is posterior to the plane.
Planes and Sections

You can divide the body and each organ using planes. For example, a parasagittal plane of the liver divides the liver into unequal left and right sections.

Study the definitions of these planes until you can form a mental image of them. You'll remember these concepts more easily if you picture the planes using your own body.

Step 8 Practice Exercise 12-2

Determine the term(s) that fits the context of the sentence to complete each sentence.

1. When the arms are at the side, the palms of the hands face forward, and the thumbs point outward, the body is in the _______________________.

2. A ___________________________ plane also is called a horizontal plane.

3. A ___________________________ plane divides the body into unequal left and right sections.

4. A frontal plane also is called a ___________________________ plane.

5. A ___________________________ or horizontal plane divides the body into superior and inferior sections.

6. A longitudinal plane also is called a ___________________________ plane.

7. A ___________________________ or frontal plane divides the body into anterior and posterior sections.
8. A ______________________________ or median plane divides the body into equal left and right sections.

9. A midsagittal plane also is called a ______________________________ plane.

10. A plane divides the body or organ into ________________________________.

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Step 9  Review Practice Exercise 12-2

☐ Check your answers with the Answer Key at the back of this book. Correct any mistakes you may have made.

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Step 10  Location Terms

☐ The location terms you learn in this lesson are important to you because providers use them to describe what they see when they examine a patient. You will learn how to pronounce the terms later in this lesson.

When doctors describe the location of anatomic parts, they use terms that compare the location of one part to another part. A number of terms describe the relative location of body parts and organs. These terms rely on the anatomical position and the anatomic sections you just learned.

Fact About Location Terms

These terms usually come in antonym pairs. Each word of an antonym pair means the opposite of the other word, such as the antonym pairs above and below or left and right.

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Providers use location terms to document the patient examination.

If you draw a transverse plane through the body or an organ, these words describe anything above or below that plane.
- **Superior** means above.
- **Inferior** means below.
- **Cephalad** means toward the top of the head.
- **Caudad** means toward the soles of the feet.

If you draw a midsagittal plane through the body or an organ, these words describe anything closer to or farther away from that plane.

- **Medial** means closer to the midsagittal plane or middle.
- **Lateral** means farther away from the midsagittal plane or middle.
If you draw a coronal plane through the body or an organ, these words describe anything in front of or behind that plane.

- **Anterior** means in front of.
- **Posterior** means in back of.
- **Ventral** means on the belly side.
- **Dorsal** means on the back side.
The following chart summarizes these location terms and how they are used.

<table>
<thead>
<tr>
<th>Location Term</th>
<th>Definition</th>
<th>Location Illustration</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superior</td>
<td>Above</td>
<td><img src="image1.png" alt="Superior Illustration" /></td>
<td>The nose is superior to the chin.</td>
</tr>
<tr>
<td>Inferior</td>
<td>Below</td>
<td><img src="image2.png" alt="Inferior Illustration" /></td>
<td>The pelvis is inferior to the abdomen.</td>
</tr>
<tr>
<td>Medial</td>
<td>Closer to the middle</td>
<td><img src="image3.png" alt="Medial Illustration" /></td>
<td>The groin is medial to the thigh.</td>
</tr>
<tr>
<td>Lateral</td>
<td>Farther away from the middle</td>
<td><img src="image4.png" alt="Lateral Illustration" /></td>
<td>The ear is lateral to the nose.</td>
</tr>
<tr>
<td>Anterior</td>
<td>In front of</td>
<td><img src="image5.png" alt="Anterior Illustration" /></td>
<td>The heart is anterior to the spine.</td>
</tr>
<tr>
<td>Posterior</td>
<td>In back of</td>
<td><img src="image6.png" alt="Posterior Illustration" /></td>
<td>The lungs are posterior to the sternum.</td>
</tr>
</tbody>
</table>
Look at some sentences showing how these words are used. Compare these statements to your own body. Be sure your body is in the anatomic position when you do so.

- The lungs are **superior** to the liver.
- The liver is **inferior** to the heart.
- The incision was made in a **cephalad** direction.
- The arteries for the lower extremities travel in a **caudad** direction.
- The nose is **medial** to the eye.
- The right thumb is **lateral** to the right index finger.
- The sternum is **anterior** to the heart.
- The lungs are **posterior** to the sternum.
- The **ventral** hernia was repaired.
- The spine is **dorsal** to the stomach.

The following terms are used for the body or an organ as a whole. They describe parts that are nearer the center or parts that are nearer the surface of the body or an organ. Examples of how these words are used follow the terms.

- **Proximal** means nearer to the center of the body or organ.
  - The knee is proximal to the foot.

- **Distal** means farther away from the center of the body or organ.
  - The foot is distal to the knee.

- **Superficial** means on or closer to the skin or surface of an organ.
  - The wound was superficial, not involving the muscles, and did not require sutures.

- **Deep** means under or farther away from the skin or surface of an organ.
  - The wound was deep and penetrated the liver.

- **Central** means within or near the center.
  - The heart is central within the rib cage.

- **Peripheral** means at or near the rim or edge.
  - The peripheral veins of the arms and hands can be seen easily.

- **Parietal** means the outer wall of a body cavity.
  - The parietal pleura forms the outer layer that surrounds the lungs.
Visceral means the covering of an organ.
The visceral pleura covers the lungs.

External means outside or closer to the skin or surface of an organ.
The pericardium is external to the heart.

Internal means inside or farther away from the skin or surface of an organ.
The lungs are internal to the ribs.

Ipsilateral means situated on or affecting the same side of the body.
The left leg and left arm are ipsilateral.

Contralateral means situated on or affecting the opposite side of the body.
The right leg and left arm are contralateral.

Some things in the body, like blood cells, fluid or nerve messages, can move. The next two terms describe body parts that carry things that move.

Afferent means carrying toward a body part or the center of an organ.
An afferent neuron is a nerve that carries nerve messages to the brain from a muscle.

Efferent means carrying away from a body part or the center of an organ.
An efferent neuron is a nerve that carries nerve messages away from the brain to a muscle.
Step 11 Pronounce New Terms

Follow these steps to learn how to pronounce new medical terms.

Please note that you will continue with the audio that you received with Course One if you are not using the online audio files.

Audio Exercise

a. Take out your Set 9 flashcards. Access the audio for Set 9.

b. Listen to the new term as it is pronounced. After you hear the term, pause the player.

c. Look at the term and practice pronouncing it out loud several times until you can pronounce it correctly and easily. Turn the flashcard over and read the meaning of the term. Continue with all the terms in Set 9.

d. Next, begin with the Set 9 flashcards and play the audio track again. This time, pronounce each term in order but do not stop the player after each term. As you pronounce each term, look at it on the flashcard. Listen to your own pronunciation of each term. If you mispronounce one, put a check mark next to it.

e. Next, listen again and practice the terms you mispronounced. Be sure you can pronounce each term clearly and easily. After you have finished pronouncing all of the terms for Set 9, move on to the next step.

f. Practice the terms you mispronounced by listening again. Be sure you can pronounce the terms clearly and easily.

Step 12 Write New Terms

Follow these steps to learn to write new medical terms.

a. Using your Set 9 flashcards, look at the first term and say it out loud. Write this term on blank paper. If the term is a word part, be sure to include the slash (/) when you write the term, just like you see it on the flashcard.

b. Turn the card over to Side B and read the meaning out loud. Write the meaning on your blank paper, beside the term. Writing these terms and meanings will help you learn them more easily. Do this for each flashcard for Set 9. After you have pronounced and written each term, learn the meanings of these terms in the next step.
Step 13  Meanings of New Terms

- Follow these steps to learn medical term meanings.

  a. Take out your Set 9 flashcards. Pronounce each flashcard term out loud. Before you look at the meaning, see if you can remember it. Check yourself by turning the flashcard over to see the meaning. Do this for each flashcard.

  b. Now turn all the flashcards over, so you are looking at Side B. Read the meaning for the first term out loud. Before turning the card over, try to say the medical term that goes with that meaning. Check yourself by turning the card over to Side A and reading the term.

  c. Practice with the flashcards several times until you are familiar with the terms and their meanings. It’s not necessary to memorize all the terms now. You will find that you begin to memorize medical terms as you use them throughout this program. Remember to keep your flashcards in order even after you’re finished with an activity so you can refer back to them easily. You may use your flashcards for all Practice Exercises and Quizzes. However, the time you spend reviewing the terms now will mean less time spent looking them up later.

Step 14  Organs and Organ Systems

- Now that you’ve laid a foundation in basic anatomy concepts, let’s take a look at the body’s major organs and organ systems.

  Tissues are grouped together to form an organ. In an organ, all the tissues work as a team. Each type of tissue has its own job to do, but together the tissues have a common purpose: the function of the organ.

  Each type of tissue does its own job. For example, the liver contains tissues from each of the basic tissue groups (epithelium, connective, muscle, nervous). The epithelium covers and protects the organ and makes the glands of the organ. Connective tissue holds the organ together and provides support or repair. Muscle tissue provides motion, contraction or pressure in ducts and vessels. Nervous tissue provides connection to the brain and warning of danger. Then, all the groups of tissues in the liver work together to perform the functions of the liver.

  In the same way, the heart contains tissues from each of the tissue groups, all acting together to perform the function of the heart. However, from a practical point of view, when a patient has a problem, the problem is not with a tissue type but with a particular organ, such as the liver or the heart.
An organ usually interacts with other organs that help it perform its function. For example, the liver, pancreas, stomach and bowel are organs that all work together to digest food. Thus, organs with similar functions or physiology are grouped together in organ systems. In fact, the different specialties of medicine represent the various organ systems. You can probably recognize some of these systems and areas of specialization already.

**Respiratory System**

The *respiratory system* is the gas exchange system that provides oxygen to the body while removing the by-product of oxygen metabolism, carbon dioxide. The body as a whole cannot do without oxygen for more than three to five minutes because a lack of oxygen to the most sensitive parts of the body—the brain and the heart—can cause permanent, if not fatal, damage.

**Cardiovascular System**

The *cardiovascular system* is the supply transportation system for the body. It brings nutrients like oxygen, glucose, amino acids and hormones to all the cells in the body and carries off the waste products of cell metabolism. The cardiovascular system includes the heart, blood vessels, lymph vessels and the blood or lymph they contain.

The heart is like the dispatcher, sending blood out in regular shipments through all the organs and cells of the body. The vascular system includes arteries, veins, capillaries and lymph channels, which are like highways and city streets. They provide a well-planned flow to and from delivery and pick up points. The blood and lymph do the actual transporting of all these materials to and from their destinations. Each type of cell specializes in the supplies and waste materials it transports.

**Nervous System**

The *nervous* or *neurological system* includes the central nervous system, which is made up of the brain and spinal cord, and the peripheral nervous system, which includes the nerves that reach each organ in the body. Because this system includes the mind, it can also be called the *neuropsychiatric system*.

**Muscular System**

The *muscular system* consists of organs that produce movement as they contract and relax. Muscles are not only in the extremities, such as the biceps muscle that bulges when you flex your elbow, but also in almost every other organ system in the body except the neurological system. The muscular system also includes the tendons and *aponeuroses*, which is connective tissue that attaches the ends of muscles to bones.
Skeletal System

The skeletal system includes bones, joints, cartilage and spine. Since it is so difficult to separate the functions of the voluntary muscles and bones, some people combine the muscular and skeletal organ systems into one system, the musculoskeletal system. Most people think bones aren’t living tissue, but rather something hard, like a rock. But each bone in your body is a living organ, just like your heart.

Integumentary System

The integumentary system includes skin, nails, hair, sweat and sebaceous glands. Integument means in the covering or in the skin. The skin and the organs the skin contains are part of this system. The skin is the largest single organ in the body! This fact explains why a large skin injury, such as a burn, can be fatal.

Endocrine System

The endocrine system includes the glands that don’t have ducts. These glands secrete within themselves directly into their blood vessels. Endocrine glands are made of epithelium tissue. They secrete hormones. Endocrine glands include the thyroid, parathyroid, pituitary and adrenal glands as well as the hypothalmus, pancreas, testes and ovaries. The testes and ovaries are also part of the reproductive system.

Digestive System

The digestive system is concerned with digestion of food. This system begins with the mouth and ends at the anus. The stomach, intestines, liver, pancreas, mouth and esophagus all belong to the digestive system. This system is also called the gastrointestinal system.

Urinary System

The urinary system filters the blood and produces urine. It includes the kidneys, ureters, urinary bladder and urethra.

Reproductive System

This organ system involves the organs for reproduction. The reproductive system includes such organs as the ovaries, uterus, vagina, breasts, testes and penis.

The Immune System

One system you may not have heard about is the immune or immunologic system, which is the system that defends the body from disease and is not clearly understood. The immune system appears to use parts of the cardiovascular system, the nervous system and the endocrine system to provide defense against some kinds of disease. The immune system provides immunity, or resistance, to diseases caused by stress, viruses and degeneration. This system helps fight cancer and tries to kill any foreign substance in the body, even a transplanted organ.
Step 15  Practice Exercise 12-3

For each sentence, circle the bracketed term that will make the sentence true. You may refer to the drawings in the text and your flashcards. Answer all questions as they pertain to the anatomic position.

1. The hand is [caudad cephalad] to the elbow.
2. Separating the body into right and left sections is called a [sagittal coronal] plane.
3. The knee is [superior inferior] or [caudad cephalad] to the chest.
4. The bellybutton is [anterior posterior] to the spine.
5. A blood vessel that carries blood away from the heart is called an [efferent afferent] vessel.
6. In the anatomic position, the palms of the hands are [posterior anterior] to the backs of the hands.
7. The nose is [lateral medial] to the eyes.
8. The buttocks are [ventral dorsal] and [cephalad caudad] to the breastbone.

Step 16  Review Practice Exercise 12-3

Check your answers with the Answer Key at the back of this book. Correct any mistakes you may have made.

Step 17  Lesson Summary

This lesson brings you along in your journey to become an effective and professional healthcare document specialist. Anatomy is an integral part of every aspect of medicine, so the ability to recognize terms and their medical context makes you a valuable member of the healthcare team.

This lesson explained the basics of human biology—the study of how the body is put together and how it works in health and disease. Human biology in the healthy state includes anatomy and physiology. Human biology in disease deals with pathology.

You learned that anatomy is the science of the structure of the body, including the appearance and relationships of body parts. The two kinds of anatomy are macroscopic anatomy and microscopic anatomy. Physiology is the study of how the body works; it describes the function of the body and its organs, tissues and cells. Physiology also can be divided into macroscopic physiology, which usually is called gross physiology, and microscopic physiology, which usually is called cell physiology.
We explained that pathology is the study of human biology when anatomy and/or physiology are abnormal. Abnormal physiology sometimes is called pathophysiology. Abnormal anatomy is called pathology or pathologic anatomy. When doctors describe the location of anatomic parts, they refer to the anatomic position and the anatomic sections with the corresponding anatomic planes. There also are specific location terms that providers use to describe the relative locations of body parts and organs.

As you continue with the next few lessons, keep in mind that everything you learn about the human body will help you in your new career. You are learning terms you will see in your daily work with physicians and other healthcare professionals.

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Step 18 Mail-in Quiz 9

- Follow these steps to complete the Quiz. Remember, you may use your flashcards to answer these questions.
  
a. Be sure you’ve mastered the instruction and the Practice Exercises that this Quiz covers.

  
b. Mark your answers on the worksheet copy of this Quiz, beginning on the next page. Remember to check your answers with the lesson content. The worksheet copy includes the detailed instructions for this Quiz.

  
c. When you’ve finished, transfer your answers to the Mail-in Quiz Cover Sheet included in this course. Use only blue or black ink on your Quiz Cover Sheet and **print in upper and lower case letters**. Red ink is unacceptable. You must **type or print** all answers so they can be read easily by the instructors. Any answers that cannot be read will be marked wrong.

  
d. **Important!** Please fill in all information requested on your Quiz Cover Sheet or when you submit your Quiz via fax. If you e-mail your Quiz, include your name, address, student ID number and program code.

  
e. Submit your Quiz to the school. Please note, send in your Quiz **once** either through mail, e-mail or fax.
Mail-in Quiz 9

For the following questions choose the best term to complete each sentence. Not all terms will be used. None of the terms will be used more than once. Each item is worth 5 points.

1. The study of how the body is put together and how it works in health and disease is called ________________________________.

2. The science of the structure of the body is called ________________________________.

3. There are ____________ kinds of anatomy.

4. Anatomy that includes parts of the body too small to be seen by the naked eye is called ________________________________.

5. The study of how the body works is ________________________________.

6. The names of body parts, the location of body parts, and the relationship of two or more body parts all are included in ________________________________.

7. Microscopic physiology usually is called ________________________________.

8. The study of human biology when anatomy and/or physiology are abnormal is called ________________________________.

9. A person ______________ have abnormal physiology and normal anatomy.

10. Abnormal physiology sometimes is called ________________________________.

11. The ________________________________ branch of a nerve carries a message to the brain from a muscle.
12. An ________________ artery carries blood away from the heart.

13. A sagittal plane made slightly to one side or the other of the midline is called a __________________________ plane.

14. The heart, blood vessels and lymph vessels are part of the ___________________ system.

15. If a doctor describes the size, shape, color, contour and texture of a body part, he is talking about _____________________.

16. In the anatomic position, the chin is anterior and ________________ to the heel.

17. The antonym of superficial is ________________________________.

18. A _______________________ plane divides the body into superior and inferior sections.

19. The opposite of ventral is ____________________.

20. In the anatomic position, the palms of the hands are facing _____________. 
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Excellent job!
You’ve learned the basics of anatomy.

Your hard work now will pay off later!

Turn the page to study landmarks and divisions as they apply to anatomy.

*Do not wait to receive the results of your Quiz before you move on.*